

## Claims

What is claimed is:

- [c1] A system for tracing a simulation design comprising:
  - an encoded assertion asserting a value of a node of the simulation design at a point in a simulation;
  - a fanin cone detection facility configured to obtain a fanin cone for the encoded assertion;
  - a waveform trace facility configured to obtain waveform data comprising a history of signal values for the node; and
  - a simulation toolkit configured to obtain node data using the fanin cone and the waveform data.
- [c2] The system of claim 1 further comprising:
  - a connectivity database comprising a connectivity description for the node.
- [c3] The system of claim 2, wherein the connectivity database is used to obtain the fanin cone.
- [c4] The system of claim 3, wherein the connectivity database resides within a simulation environment.
- [c5] The system of claim 1, wherein the fanin cone detection facility is configured to obtain the fanin cone prior to execution of the simulation environment.
- [c6] The system of claim 1, wherein the waveform trace facility is configured to obtain the waveform data prior to execution of the simulation environment.
- [c7] The system of claim 1, wherein the node data is obtained during execution of the simulation.

- [c8] The system of claim 1, wherein the node data is obtained using hooks into a simulation image.
- [c9] The system of claim 1, wherein the fanin cone detection facility provides fanin cone information in a binary format.
- [c10] The system of claim 9, wherein the binary format facilitates a third party format of the node data.
- [c11] The system of claim 1, wherein the assertion is a sequential assertion.
- [c12] The system of claim 11, wherein the simulation design comprises a specification for a compiler to understand the sequential assertion.
- [c13] The system of claim 1, wherein the encoded assertion is modified while the simulation is executing.
- [c14] A method of tracing a simulation design comprising:
  - obtaining an assertion for a simulation image of the simulation design;
  - generating hooks into the simulation image using a simulation toolkit to obtain an instrumented simulation image, wherein the hooks are generated based on the assertion, a fanin cone, and waveform data; and
  - executing the instrumented simulation image in a simulation environment to obtain node data from the assertion.
- [c15] The method of claim 14, further comprising:
  - debugging a failure of the assertion using the node data.
- [c16] The method of claim 15, wherein the debugging is performed while simulation is executing.

- [c17] The method of claim 14, further comprising:  
modifying the assertion during execution of the simulation environment.
- [c18] The method of claim 14, wherein obtaining the fanin cone occurs prior to the execution of the simulation environment.
- [c19] The method of claim 14, wherein obtaining the waveform data occurs prior to the execution of the simulation environment.
- [c20] The method of claim 14, wherein obtaining the fanin cone comprises tracing the fanin cone using a connectivity database.
- [c21] The method of claim 14, wherein the assertion is a sequential assertion.
- [c22] The method of claim 21 further comprising:  
generating a directive for the design to obtain a state device for the sequential assertion.
- [c23] A computer system for tracing a simulation design comprising:  
a processor;  
a memory;  
a storage device; and  
software instructions stored in the memory for enabling the computer system to:  
obtain an assertion for a simulation image of the simulation design;  
generate hooks into the simulation image using a simulation toolkit to obtain an instrumented simulation image, wherein the hooks are generated based on the assertion, a fanin cone, and waveform data; and execute the instrumented simulation image in a simulation environment to obtain node data from the assertion.

- [c24] The computer system of claim 23 further comprising:  
software instructions to debug the failure of the assertion using the node data.
- [c25] The computer system of claim 23 further comprising:  
software instructions to modify the assertion during the execution of the simulation.
- [c26] An apparatus for tracing a simulation design comprising:  
means for obtaining an assertion for a simulation image of the simulation design;  
means for generating hooks into the simulation image using a simulation toolkit to obtain an instrumented simulation image, wherein the hooks are generated based on the assertion, a fanin cone, and waveform data;  
means for executing the instrumented simulation image in a simulation environment to obtain node data from the assertion; and  
means for debugging the failure of the assertion using the node data.